

REMARKS

In view of the following remarks, the Examiner is requested to withdraw the rejections and allow Claims 1-30, the only claims pending and currently under examination in this application.

Claims 21, 24 and 30 have been amended for clarification. Support for these amendments can be found on page 8, lines 14-18, and Figure 1C; p. 6, lines 8-12, and p. 14, lines 13-16. As such, no new material is added by way of these amendments.

35 USC § 112

Claims 21-27 were rejected under 35 U.S.C. § 112, first paragraph, as being non-enabling. The Examiner maintains that the specification, while being enabling for a deformable wall portion in the form of a plastic or elastic film, does not reasonably provide enablement for a device including a plastic or elastic film and a separate deformable wall portion.

Claims 21 and 24 have been amended to clarify that the plastic or elastic film (element 18 in Fig. 1C) forms the deformable wall portion referred to in Claims 24-26. Accordingly, this rejection may be withdrawn.

Claims 21-27 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. The Examiner states that it is unclear what side is covered with the plastic or elastic film and how the covering is related to the other claimed elements.

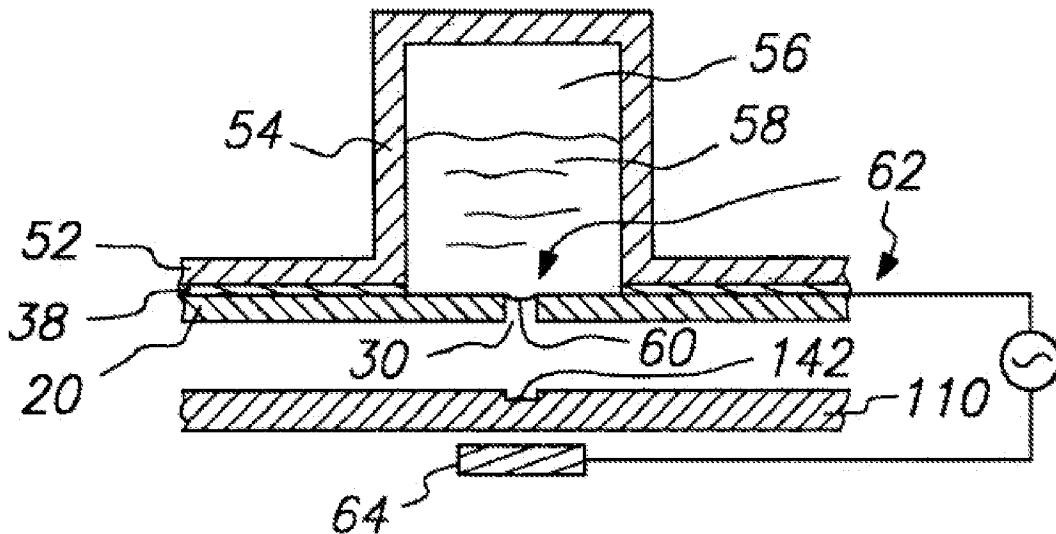
As discussed above, Claims 21 and 24 have been amended to clarify that the plastic or elastic film covers the first end of each well, as per the Examiner's suggestion. Accordingly, this rejection may be withdrawn.

35 USC § 102

Claims 1-5, 10-14, 16-20, and 29 were rejected under 35 U.S.C. § 102(e) as being anticipated by Bjornson et al. US 6,284,113.

An element of Claim 1 is a method for transferring liquids from a plurality of wells having openings arranged in a selected format to at least one receptacle. The claimed method includes displacing liquid in each well so that a convex meniscus swells from the opening, and contacting an orifice of a receptacle with the swollen meniscus to draw at least a portion of the liquid into the receptacle.

In making this rejection, the Examiner alleges that Bjornson teaches a meniscus 60 formed at opening 30 (Office Action, p. 5), as shown in the figure below:



However, as is clear from the above illustration, nowhere does Bjornson disclose a convex meniscus that swells from opening 30, as in the claimed invention. Fig. 2B from the current specification is shown below:

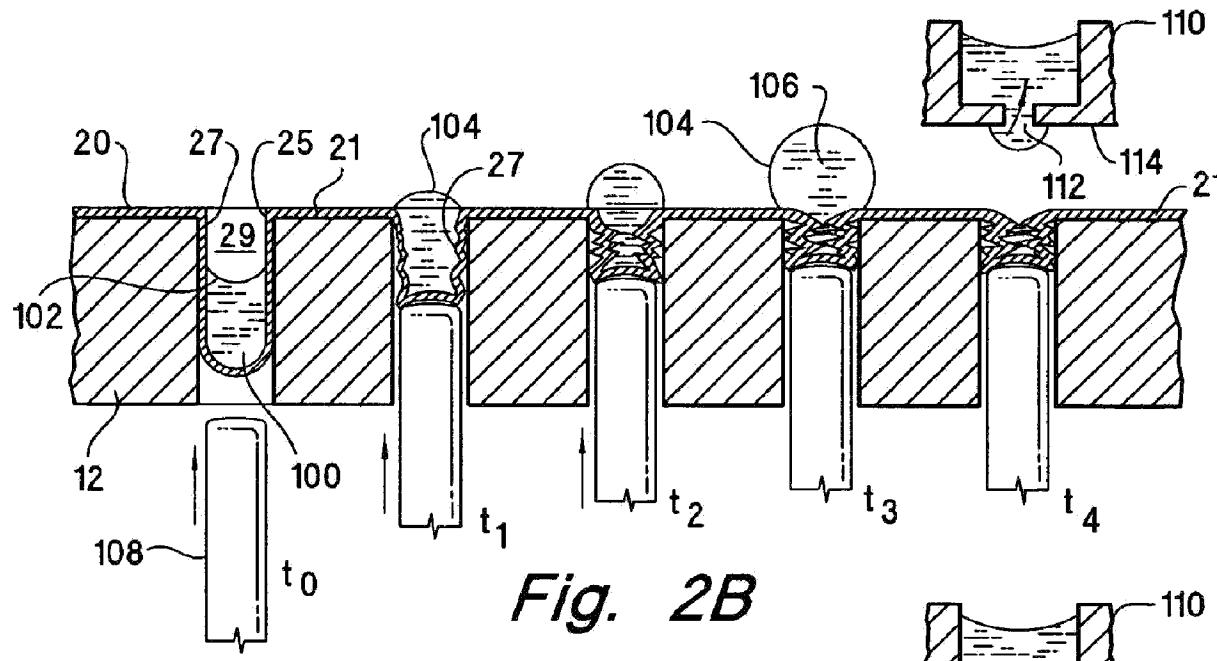


Fig. 2B shows convex meniscus 104 swelling from opening 25. The claimed invention comprises the method of displacing liquid in each well so that a convex meniscus swells from the opening. The swollen convex meniscus 104 allows receptacle 110 to draw at least a portion of the liquid into the receptacle via surface interaction. (p. 13, lines 3-7)

In contrast, the method in Bjornson discloses meniscus 60, which is entirely located within in the aperture in plate 20. Meniscus 60 in Bjornson does not extend close to, and certainly does not swell from opening 30, as in the claimed invention.

Furthermore, the Examiner alleges that Claim 1 only requires displacing the liquid. The Examiner alleges that the claim does not specify or require the displacing of the liquid to result from any particular actuation or employment of any specific device. (Office Action, p. 2)

The Applicants respectfully disagree. As discussed in the previous response, Claim 1 is a method claim which includes the step of "displacing liquid in each well so that a convex meniscus swells from the opening". The use of the verb "displacing" to

indicate an active process is consistent with the definition “to move or put out of the usual or proper place” (Dictionary.com). If, for example, the Applicants had intended to indicate a passive process, the claim might have been worded as the liquid “is displaced”. In fact, the claims in Bjornson, which disclose a passive process, are constructed with similar wording: “inverting said multiwell plate...so that liquid is disposed at each of said apertures..” (col. 33, line30-31)

Furthermore, the Applicants refer the Examiner to claims which depend from Claim 1, which further make it clear that the process of displacing liquid is an active one. For example, Claim 2 contains the element “comprising steps of displacing the liquid”, Claim 3 recites “wherein the liquid displacing step comprises inwardly deforming a wall of each well to displace the liquid” and Claim 4 recites “wherein the inwardly deforming step comprises applying mechanical pressure at an outer surface of the wall”. The Applicants therefore maintain that the claim language of Claim 1, and the claims which depend from it, clearly indicate that displacing liquid in each well is an active process.

As discussed in the previous response, this is in contrast to the method in Bjornson, which discloses the formation of a meniscus by inverting an apparatus, which is a passive process. Bjornson states at column 5, line 46-50: “The multiwell plate is attached to the second plate and the assembly is inverted so that liquid is disposed at each of the apertures. The dimensions and surface properties of the apertures are such that liquid does not exit the apertures under gravity conditions.” Bjornson et al. also state at column 15, line 65 to column 16, line 16: “Once device 100 is attached to multiwell plate 54, the resulting apparatus 50 is inverted so that each of the apertures 30 fills with liquid. A meniscus 60 is formed at opening 34.” As such, the formation of the meniscus at aperture 34 is a function of the dimensions and surface properties of the apertures. The formation of the meniscus at aperture 34 is not the result of actively displacing the liquid in multiwell plate 54 with a displacing fluid, as claimed.

In view of the above discussion, the Applicants maintain that Claim 1 and the claims which depend from it clearly specify the element of a convex meniscus that

swells from the opening, and clearly specify that the step of displacing liquid in each well is an active process. As such, these elements are not disclosed in Bjornson.

Claim 1 also includes the element of "contacting an orifice of a receptacle with the swollen meniscus to draw at least a portion of the liquid in the receptacle". The Examiner states that Bjornson discloses transfer element 622 which is employed to force liquid from the aperture (Office Action, p. 2).

However, the Applicants point out that the "transfer" disclosed in Bjornson does not include "contacting an orifice of a receptacle with the swollen meniscus" as in the claimed invention, because the method in Bjornson involves either the electrical activation of the apertures causing a droplet to fall, or the use of capillary sized dispensing tubes to form small drops of fluid and locate them on the arrays (col. 23, lines 9-14, and col. 24, lines 30-32, and Fig. 19).

In contrast, in the current invention the liquid transfer is effected directly from the depots to the corresponding receptacles without contact between depots and the receptacles, and without interposition of any transfer device between depots and the receptacles (p. 4, lines 1-3), as discussed above (See Fig. 2B, above). As such, transfer of the liquid can be made directly to a receptacle 110 such as a reservoir in a microfluidic device or a reservoir in a print head.

Therefore, the only contacting of the meniscus in Bjornson is with a capillary sized dispensing tube. Nowhere in Bjornson is there the element of contacting the meniscus with the orifice of a receptacle as in the current claims.

Accordingly, Bjornson et al. fail to teach the elements of Claim 1, or any of the claims dependent thereon, namely, displacing liquid in each well so that a convex meniscus swells from the opening, and contacting an orifice of a receptacle with the swollen meniscus to draw at least a portion of the liquid into the receptacle.

An element of Claim 29 in the present case is a depot member comprising a plate with a plurality of wells each having a first end and an opening at a second end, wherein each well includes a deformable wall portion at the first end.

The Examiner alleges that piezoelectric material may provide for dispensing in two manners, by deforming the material and by vibrating the material (Office Action, p. 2). The Applicants maintain, however, as in the previous response, that Bjornson et al. do not teach a deformable wall portion at the first end. The piezoelectric element in Bjornson et al. is not a structural element of the wall in each well. The Examiner has only identified the vibrating cantilever as a deformable structure. Since the vibrating cantilever is not a portion of the well wall, Bjornson et al. fail to teach this element of Claim 29.

Because Bjornson et al. fail to teach the above-listed elements of Claims 1, 21, and 29, Applicants respectfully request that the rejection of Claims 1, 21, and 29 under 35 U.S.C. § 102 (e) be withdrawn.

Claims 29-30 were rejected under 35 U.S.C. 102(e) as being anticipated by Madden et al. (US 6,783,732).

An element of Claim 29 is a depot member comprising a plate with a plurality of wells each having a first end and an opening at a second end, wherein each well includes a deformable wall portion at the first end.

The Examiner alleges although Madden is silent as to the device being deformable, the term deformable is interpreted to mean the device is elastic, bendable, flexible. The Examiner alleges that because Madden discloses that the plates are manufactured from somewhat elastic materials (Office action p. 2), Madden anticipates the current invention.

The Applicants respectfully disagree. The Applicants point out that the cited portion of Madden reads as follows: "The plates of the microfiltration apparatus may be constructed of any substantially rigid, water insoluble, fluid-impervious material....The term "substantially rigid" as used herein is intended to mean that the material will resist deforming or warping under a light mechanical or thermal load, although the material may be somewhat elastic" (col. 11 lines 66-col. 12 line 6).

Madden, therefore, discloses the plates as "substantially rigid" and furthermore, the Examiner has not identified where it is taught in Madden et al. that each well includes a deformable wall portion at the first end. The device depicted in Figure 2 of Madden et al. does not include wells with a deformable wall portion. Madden et al. are silent with respect to the deformation of a well wall during the operation of the device depicted in Figure 2 shown below:

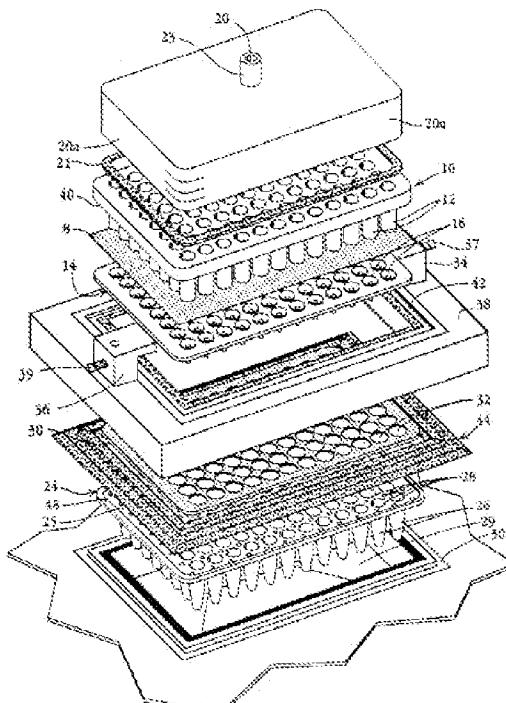


Fig. 2

As such, Madden et al. fail to teach the above listed element of Claim 29.

An element of Claim 30 is a depot member comprising a plate with a plurality of wells each having an opening at a second end and a vent at a first end positioned away from said opening, wherein the vent is covered by a membrane that is permeable to a displacing fluid.

The Examiner alleges that it is not clear where and in what structure the vent is located, and that it appears that the vent is nothing more than the opposite closed end of the open end of the well (Office Action, p. 2-3)

Claim 30 has been amended for clarification, the elements of which are shown in Figure 6B below:

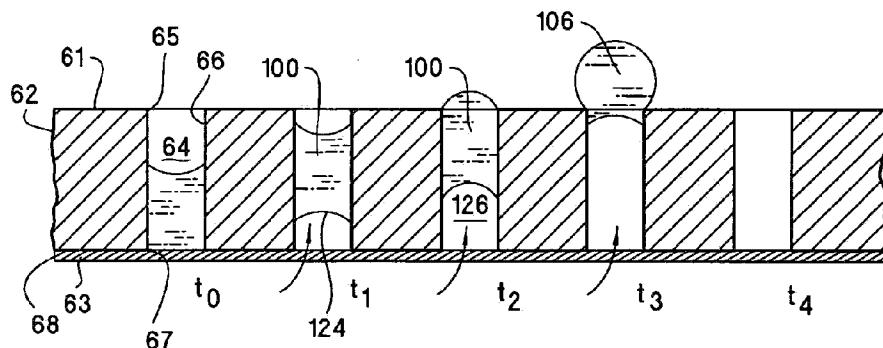


Fig. 6B

As stated in the specification, “[g]as-permeable membrane 68 inhibits escape of the liquid out from the depot, but permits passage of a gas into the depots by way of circular openings 67, which accordingly serve as vents.” (p. 14, lines 13-16). Element 67 therefore, is the circular opening, or vent, which is covered by membrane 68.

The Examiner alleges that Madden et al. disclose a drip plate 16 with multiple wells, each having an open end 16c and an opposite vent hole covered by filter element 8a (permeable membrane, see figure 4). (Office Action, p. 3)

Figure 4 of Madden is reproduced below:

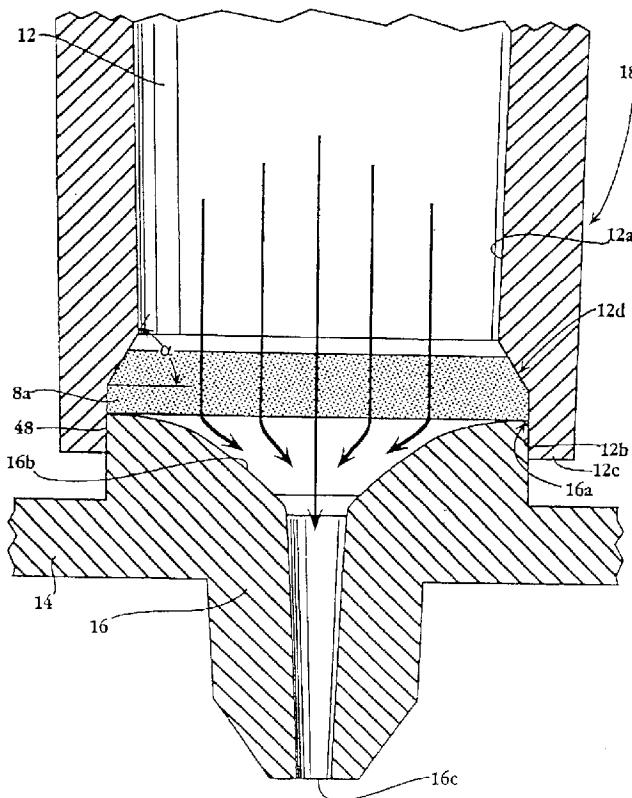


Fig. 4

The Examiner is equating the “vent hole covered by filter element 8a” in Fig. 4 above with the vent covered by a membrane in the current claims. As shown above, opening 16c which the Examiner refers to is not an opening at the end of well 12, but is located in drip plate 16. Furthermore, the filter element 8a is not located at a first end, but is located between well 12 and drip plate 16. The Examiner has therefore not pointed to where Madden discloses “a plate with a plurality of wells each having an opening at a second end and a vent at a first end...wherein the vent is covered by a membrane.”

As such, Madden et al. fail to teach the above-listed element of Claim 30.

Accordingly, the Applicants respectfully request the rejection of Claims 29-30 under 35 U.S.C. § 102(e) be withdrawn.

Claims 29-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Clark (US 5,219,528).

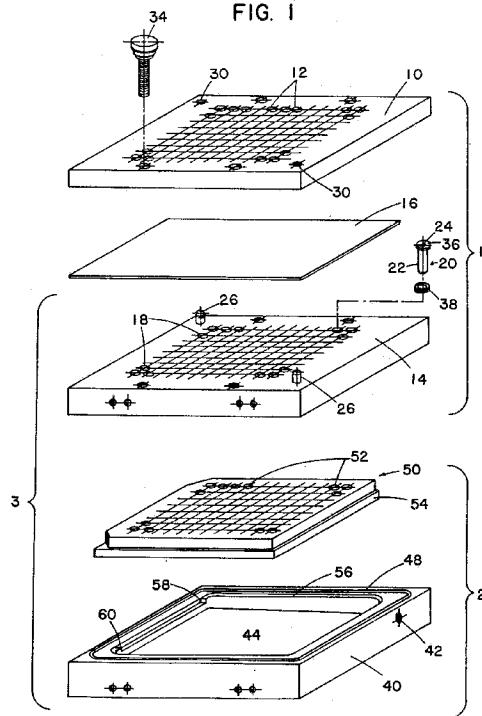
An element of Claim 29 is a depot member comprising a plate with a plurality of wells each having a first end and an opening at a second end, wherein each well includes a deformable wall portion at the first end.

The Examiner alleges that the wells of Clark are disclosed as being plastic (inherently flexible, see column 1, line 23). (Office Action, p. 3). The cited portion of Clark from the background section reads as follows: "One type of immunoassay procedure, commonly referred to as ELISA, utilizes a solid support such as the well in a plastic plate..."

However, the Examiner has not identified where it is taught in Clark that each well includes a deformable wall portion at the first end. The mere fact that plastic plates has been disclosed does not anticipate the element of the current invention in which each well includes a deformable wall portion.

Figure 1 of Clark is as follows:

FIG. 1



There is no disclosure in Clark of a portion of the wall of the wells that is deformable, and there is no disclosure of a deformable wall portion that displaces water when it is inwardly deformed. As such, Clark fails to teach the element of Claim 29 that each well includes a deformable wall portion at the first end.

An element of Claim 30 is a depot member comprising a plate with a plurality of wells each having an opening at a second end and a vent at a first end positioned away from said opening, wherein the vent is covered by a membrane that is permeable to a displacing fluid.

The Examiner alleges that membrane 16 covers the upper opening (vent) of each well. (Office Action, p. 3) The Examiner also alleges that Clark teaches that when a liquid is placed in the holes in the top plate and a vacuum is created in the chamber, the liquid is drawn at a controlled rate into the chamber. (Office Action, p. 7)

However, the Examiner has not identified where it is taught in Clark that when displacing fluid is introduced through the membrane and vent while water is in the well, the water will be displaced from the well to form a convex meniscus swelling from the opening.

In fact, the cited portion of Clark (Office Action, p. 7) states that:

“...a microtiter plate containing a plurality of wells positioned within the chamber such that the ends of the cannulas extending beneath the bottom surface of the middle plate are located within said wells with the degree of extension within said wells of the microtiter plate being such that the ends of the cannulas are in close proximity and just above the bottom of the wells so that liquid deposited in said wells extends above the ends of the cannulas... (col. 8, lines 9-18)

The Examiner is citing a portion of Clark which discloses that the end of the cannulas (which the Examiner is equating with the wells of Claim 30) extend into the wells below so that liquid deposited in the wells extends above the ends of the cannulas. If the ends of the cannulas extend beneath the surface of liquid in the wells below, there is no way that water displaced from the well (cannula) could “form a convex meniscus swelling from the opening”. A meniscus cannot be formed in Clark because the opening of the cannula is below the level of liquid in the wells below.

Furthermore, Clark specifically discloses that “drops” are not permitted to remain on the cannulas. (col. 5, lines 29-34)

As such, Clark fails to teach the element of Claim 30 that a depot member comprising a plate with a plurality of wells each having an opening at a second end and a vent at a first end positioned away from the opening wherein the vent is covered by a membrane that is permeable to a displacing fluid.

Applicants respectfully request the rejection of Claims 29-30 under 35 U.S.C. § 102(b) be withdrawn.

Claim Rejection – 35 USC § 103

Claims 6-9 and 28 were rejected under 35 U.S.C. 103 (a) as being unpatentable over Bjornson et al. as applied to Claims 1-5, 10-14, 16-27 and 29, and in further view of Madden et al.

The Examiner states that Bjornson, et al. do not disclose employing a permeable membrane.

The Applicants maintain that as discussed above, Bjornson et al. fail to teach or suggest all the elements of Claim 1, namely, displacing liquid in each well so that a convex meniscus swells from the opening, and contacting an orifice of a receptacle with the swollen meniscus to draw at least a portion of the liquid into the receptacle.

Madden is cited for the disclosure of vents, with a gas-permeable matrix which covers the vents. However, since Bjornson et al. fail to teach or suggest all the elements of Claim 1, and the claims which depend from them, the addition of Madden fails to remedy this deficiency.

An element of Claim 28 is a depot having a plurality of wells, and at least one receptacle such that liquid displaced through the well openings contacts the receptacle at the orifice; wherein each well comprises a vent positioned away from the opening, and the liquid-displacing means comprise means for introducing a displacing fluid through the vents and into the wells; wherein the vent is covered by a membrane that is permeable to the displacing fluid.

The Examiner has stated that Bjornson, et al. do not disclose employing a permeable membrane. Additionally, as discussed above, Bjornson et al. fail to teach all the elements of Claim 28, namely, actively displacing liquid in each well, and contacting liquid displaced through the well openings with the receptacle at the orifice.

Madden et al. was cited solely for disclosing a multiwell arrangement and in one embodiment, that the vacuum pathways pass through the plane of the collection-tray upper surface by way of the vents that traverse the collection tray proximate each of said collection wells (according to column 6, line 35+). However, since Bjornson et al. fail to teach or suggest all the elements of Claim 28, the addition of Madden fails to remedy this deficiency.

Therefore, because Bjornson fails to teach or suggest all the elements of Claim 1 and Claim 28, Madden et al. fail to make up for this deficiency. As such, Applicants respectfully request that the rejection of Claims 6-9, which depend from Claim 1, and Claim 28 under 35 U.S.C 103 (a) be withdrawn.

Claim 15 was rejected under 35 U.S.C § 103 (a) as being unpatentable over Bjornson et al. as applied to Claims 1-5, 10-14, 16-27, and 29, and further in view of Churchill et al.

The Examiner states that Bjornson, et al., do not disclose employing a heat dispensing actuator. However, as stated above, Bjornson et al. fail to teach or suggest all the elements of Claim 1, namely, displacing liquid in each well so that a convex meniscus swells from the opening, and contacting an orifice of a receptacle with the swollen meniscus to draw at least a portion of the liquid into the receptacle.

As Churchill et al. was cited solely for disclosing that other types of dispensers and valve actuation devices exist and may be used, Churchill et al. fail to make up for the fundamental deficiency of Bjornson.

Accordingly, because Bjornson fails to teach or suggest all the elements of Claim 1 and Claim 28, Madden et al. fail to make up for this deficiency. As such, the Applicants respectfully request that the rejection of Claim 15, which depends from Claim 1, under 35 U.S.C. § 103(a) be withdrawn.

CONCLUSION

In view of the amendments and remarks above, the Applicants respectfully submit all of the claims are in condition for allowance, which action is requested. If the Examiner finds that a telephone conference would expedite the prosecution of this application, please telephone Bret Field at (650) 327-3400.

The Commissioner is hereby authorized to charge any fees under 37 C.F.R. §§ 1.16 and 1.17 which may be required by this paper, or to credit any overpayment, to Deposit Account No. 50-1078.

Respectfully submitted,

Date: February 8, 2008

By: /Lynn J. Kidder, Reg. No. 56,107/
Lynn J. Kidder
Registration No. 56,107

Date: February 8, 2008

By: /Bret E. Field, Reg. No. 37,620/
Bret E. Field
Registration No. 37,620

Agilent Technologies, Inc.
Legal Department, DL429
Intellectual Property Administration
P.O. Box 7599
Loveland, CO 80537-0599